

**LIBRARY
MEDICAL RESEARCH LABORATORY NO. 47**

MEDICAL RESEARCH LABORATORY



**U. S. Naval Submarine Base
New London**

**DESIGN OF A METHOD FOR RECORDING MEDICAL DATA SIGNIFICANT IN
MEDICAL EXAMINATIONS FOR SUBMARINE SCHOOL CANDIDATES IN
ORDER TO PERMIT RAPID ANALYSIS BY PUNCH CARD TECHNIQUES**

Project No. X-247 (Sub. No. 51)

Progress Report No. 2

This report was prepared by

**Commander T. L. Willmon, (MC) U.S.N
and
Lt. (JG) N. R. Bartlett, H-V(S), USNR**

**DEGRADED TO
UNCLASSIFIED**

**Captain C. W. Shilling, (MC), USN
Medical Research Laboratory
U. S. Submarine Base
New London, Conn.**

**APPROVED FOR PUBLIC
RELEASE - DISTRIBUTION
UNLIMITED**

25 October 1944

Summary and conclusions:

Some trends in the physical and psychological characteristics of enlisted candidates for the Submarine School, New London, Connecticut are reported. These trends are revealed by analyses of International Business Machine cards punched in accordance with the technique outlined in an earlier report on this project.

1. A marked improvement in certain psychological characteristics is noted.
2. There has been an increase in the number of men failing standards for visual and auditory sensitivity.
3. Motivation and physical examination data (exclusive of auditory and visual function) show no significant trend.

Problem:

All candidates for the Submarine School, New London, Connecticut, are examined by the Submarine Medical Examiner for qualification for school. This examination is comprehensive; it is not limited strictly to a physical examination but covers such factors as motivation, emotional stability, intelligence, and experience. The purpose of this project is to determine the pattern of disqualifications of men received from any school or training center. The punched-card technique outlined in a previous report was developed for the specific purpose of preparing accounts of men received for every source each month (1).

The Bureau of Personnel and the Bureau of Medicine and Surgery issued directives specifying the standards these sources will use in selection for submarine school (2). It would be anticipated that the combined effect of the directives plus the monthly reports to each activity from the Submarine School would be reflected in the disqualifications by the Medical Examiner during the past months. This report shows the general trends during the six month period from April to September 1944 inclusive.

Method:

An IBM card is punched for each candidate for Submarine School directly he completes the medical examination (1). On the tenth of every month a tabulation is made of all examinations for the previous month. In this tabulation there is some overlapping from one rejection to another,

since occasionally a man is disqualified for more than one defect. Nevertheless, a summary of all rejections reveal general trends.

Results and Discussion:

In the examinations at New London there are five spheres in which a man must not be markedly deficient (1). For convenience these are labeled as (a) motivation, (b) intelligence, (c) psychiatric condition, (d) physical condition, and (e) sensory acuity. The number and proportions of candidates disqualified under each of these general headings is shown in Table 1, below, for each of the past six months.

TABLE 1

Number and relative proportions of failures in examinations for each month of the period April-September 1944

Total Number examined		APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
		<u>1309</u>	<u>1091</u>	<u>862</u>	<u>953</u>	<u>1037</u>	<u>866</u>
Motivation Failures	N	108	98	105	123	119	87
	%	8.3	9.0	12.2	12.9	11.5	10.0
Intelligence Failures	N	173	110	78	63	55	33
	%	13.2	10.1	9.1	6.6	5.3	3.8
Psychiatric Failures	N	144	134	74	78	80	50
	%	11.0	12.2	8.6	8.2	7.7	5.8
Physical Failures	N	69	66	30	29	54	27
	%	5.3	6.0	3.5	3.0	5.2	3.1
Sensory Failures	N	48	31	45	69	87	66
	%	3.7	2.8	5.2	7.2	8.4	7.6

It is not possible to determine the relative significance of the five general spheres from these data; as changes in the preselection have resulted in changes in the character of the population examined. The criteria for passing in each of the spheres are clinical judgments, but so far as possible fixed standards are used. If one may assume that the

standards at New London have remained relatively constant, then the general trends in attrition at New London reflect directly the trends in preselection. Thus, it would appear that the selection of candidates on the basis of intelligence has improved radically; from 13.2% in April the attrition rate has decreased steadily to 3.8% for September. Again, the character of preselection with respect to psychiatric examinations has also improved reliably. And third, there has been some deterioration in selection with respect to sensory acuity; or more properly, with respect to visual acuity, auditory acuity and color discrimination. The trends in selection for motivation and physical examinations are not so clear-cut. Apparently there is more fluctuation in these latter bases.

Changes in the distributions of ages and scores for certain psychological tests have occurred. Many of the Naval activities supplying the candidate population have been issued directives establishing test score standards for submarine selection. These directives have specified a score of 50 or higher (Navy Standard Score) on the General Classification Test, and a score below 14 (raw score) on the Personal Inventory. It would appear that the attrition in the psychological part of the medical examination should reduce as these directives take effect.

Evidence is accumulating to support the belief that men in their twenties are held in higher esteem by submarine officers than are younger men (3). And by other reasoning it is considered that men past thirty are not as likely to have the necessary resistance and stamina. For Table 2 below, the age interval 20-29 years has been assumed optimal. The increase in the population falling in this optimal interval is significant, and thus the overall fitness of the population presumably improved during the period of this study.

The percentage satisfying General Classification Test Standards for the first five months of the year have been calculated from distributions for the Otis test. GCT scores for the last four months were copied from the Qualifications Card in the service record, and are Navy Standard Scores. In the event no record was available, a Form 1 GCT was administered.

TABLE 2

Relative proportion of submarine school candidates in favorable test score and age categories for the period January-September 1944, inclusive, according to the month of receipt at New London.

- continued next page -

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Percentage satisfying GCT standards	73.1	71.7	67.8	70.5	66.8	82.5	89.8	92.6	94.1
Percentage satisfying Personal Inventory standards	86.0	84.1	83.7	85.7	83.9	85.7	88.5	89.6	93.1
Percentage in optimal age range	29	33	34	44	42	48	47	49	52

More careful preselection, including tests and interviews, should reduce attrition under the motivation, intelligence, and psychiatric categories. The losses under physical and sensory headings should largely disappear when medical examinations for submarine volunteers are conducted as specified by the Bureau of Medicine and Surgery (2).

References:

1. Report No. 1 on this project, dated 1 May 1944, "Design of a method for recording medical data for submarine school candidates in order to permit analysis by punched-card techniques."
2. Directives issued by the Bureaus of Medicine and Surgery and of Personnel, particularly:
 - (a) Manual of the Medical Dept., Art. 1535, as amended in BuMed ltr. BuMed-R1-QM, P203/ss (123) dated 21 April 1944.
 - (b) BuPers ltr. Pers-6374-hmg NC from the Chief of Naval Personnel to specified Class A Schools, dated 22 May 1944.
 - (c) BuPers Circ. ltr. 253-44; N. D. Bull, dated 15 September 1944.
3. Progress Report No. 1 on Project No. X-243 (Sub. No. 47) entitled "Relationship of personnel selection devices to the behavior criteria of school performance and overall performance on a submarine patrol." (in preparation).